International Comparative Jurisprudence 1 (2015) 133–142

HOSTED BY

Contents lists available at ScienceDirect

International Comparative Jurisprudence

journal homepage: www.elsevier.com/locate/icj

The need for legal regulation of global emissions from the aviation industry in the context of emerging aerospace vehicles

Paulina E. Sikorska [1]

McGill University, Montreal, Quebec, Canada H3A 1W9

ARTICLE INFO

Available online 11 December 2015

Keywords:
Greenhouse gases
Black carbon
Aerospace vehicles
Suborbital flights
International emissions regulations
Soft law

ABSTRACT

Emissions of black carbon from aerospace vehicles pose a challenge to international regulators. This mode of transport is still in its infancy, but is predicted to develop rapidly. Despite the lack of comprehensive scientific research, it has been argued that black carbon is the main contributor to climate change after greenhouse gases.

These emissions, which cause transboundary pollution, cannot be effectively reduced by national laws because of differences in emissions standards. The main challenge is how to regulate them – through binding or non-binding laws – and in which form – harmonisation or unification of laws. International air and space regulations are subject to the trends of politicisation and economisation. The lack of a binding international law that regulates greenhouse gas emissions from the aviation industry is primarily caused by a lack of political will and economic calculations of certain states with respect to limits on their national interests. This article proposes soft law as a solution to stagnation in creating binding international regulations for emissions in the aviation and aerospace industry.

1. Introduction

In the 21st century, vehicles of a new kind are emerging – aerospace vehicles, which can be defined as "flight instrumentalities that have all the attributes of aircraft in addition to the capability to operate in outer space" (Pelton & Jakhu, 2010, p. 231). The focus of this article is on aerospace vehicles for suborbital flights, during which they will emit black carbon. The concept of suborbital flight, which is not defined under international law, is however defined in the US Commercial Space Launch Amendments Act (2004) as “the international flight path of a launch vehicle, reentry vehicle, or any portion thereof, whose vacuum instantaneous impact point does not leave the surface of the Earth” (Committee on the Peaceful Uses of Outer Space, 2010). An aerospace vehicle takes off from a spaceport exactly like an aircraft would, goes into

E-mail address: paulina.sikorska@mail.mcgill.ca

[1] Paulina E. Sikorska is a recent graduate of McGill University, Canada, where she attained a Master of Laws in Air and Space Law, and is a lifetime member of the Institute of Air and Space Law at McGill.

The article is based on a paper presented at the International Academic Conference on Law, Politics and Management (IACLPM 2015) that was held in Vilnius, Lithuania, on 28–29 May 2015.
Peer review under responsibility of Mykolas Romeris University.

http://dx.doi.org/10.1016/j.icj.2015.12.004

outer space like a spaceship, stays in suborbit for a couple of minutes (with the effect that passengers feel a lack of gravity) and comes back to the spaceport again in the fashion of an aeroplane. An ongoing problem is the distinction between the air zone and outer space, but this dispute is less important for the purpose of emissions – particularly because on 29 May 2014, Virgin Galactic signed an agreement with Spaceport America as that company is prepared to clear off its suborbital flights (Forbes, 2014).

These vehicles emit, among other things, black carbon, which is "a light-absorbing solid particle emitted as a result of the incomplete combustion of carbon-based fuels (i.e., fossil fuels, biofuels, wood)" (Environment Canada, 2015). As such, it is claimed to be the second-biggest contributor to climate change after greenhouse gases (UN Reg Inf Cent West Eur UNRIC, 2013). An IPCC report from 2014 indicates that black carbon emitted from suborbital vehicles is characterised as having "indirect radiative forcing effects and large regional impacts" (Climate Change, 2014), and despite its short duration (Ramanathan & Carmichael, 2008, p. 221–222), may contribute to climate change (Climate Change, 2014). The main consequence of emissions left unattended is their fast growth, which contributes to climate change.

Climate change is defined as a long-term, irreversible process of physical and chemical changes in atmospheric structure that causes an increase in the Earth's temperature and radical weather anomalies (NASA, 2008). According to the Global Warming Policy Foundation, climate change is characterised by "changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer" (IPCC Introduces New 'Climate Change' Definition, 2011). The most visible results are rising global temperatures, intensive rain, long droughts, floods and hurricanes (US EPA, 2015). Greenland and West Antarctica are losing their ice, which also leads to higher sea levels (National Geographic Society, 2015).

Climate change is to large degree a result of emissions of carbon dioxide (CO_2), as well as carbon monoxide (CO), oxides of nitrogen (NO_x), methane (CH_4), sulphur dioxide (SO_2), nitrous oxide (N_2O) and non-methane volatile organic compounds (NMVOCs) (Treanton, 2001, p. 96). Although aviation contributes "only" up to 3% of global emissions (Reducing emissions from aviation, 2014), this number is likely to increase by up to 15% by 2050 (Dubois & Ceron, 2006, p. 181) if no preventive measures are implemented at an international level. In other words, the aviation industry will make an increasing contribution to climate change in the future if no new laws are imposed to mitigate these emissions, especially in light of the likely doubling of air traffic from 1998 to 2020 (Anderson et al., 2006, p. 1).

The fuel of suborbital vehicles, which has similar properties to that currently used for rockets, adversely affects the ozone layer and thus contributes to the depletion of ozone (Friedberg, 2013, p. 207). There is therefore much to worry about, despite the statement of Sir Richard Branson, the founder of Virgin Galactic, who said that space tourism would have only a minor impact on climate change (Branson, 2013). Researchers from the National Center for Atmospheric Research in Boulder, Colorado, are currently measuring emissions of black carbon from the spaceport in New Mexico (Shiga, 2010), and the simple answer at this stage of research is that the space tourism will adversely affect climate change. Emissions of black carbon from suborbital vehicles should therefore be included to create a complete picture of the harmonisation problem.

In spite of many international soft and hard laws, including the Stockholm Declaration (1972), the Geneva Convention (1979), the Vienna Convention (1985) and Montreal Protocol (1987), the UN Framework Convention on Climate Change (1992) and its Kyoto Protocol (1997), and the resolutions of the International Civil Aviation Organization (ICAO), there is no international legal framework that deals with emissions from aerospace vehicles. The lack of movement on the issue of emissions from aviation industry was interrupted by Directive 2008/101/EC (Directive 2008/101/EC, 2008) and its entry into force in 2012 (hereinafter the EU Directive). This constitutes the first binding, although European, piece of legislation that includes emissions from the aviation industry. However, the EU Directive includes international airlines in its scope, thus causing a global disagreement and accusation by some states (including USA, China, and Russia) of the ICAO's role in regulating international civil aviation being usurped. The ICAO had no choice but to deal with this issue at its session in 2013, and decided to start working on global market measures with a view to achieving a framework for the regulation of emissions by 2020 (ICAO, 2013).

This article provides reasons for the failure of international air and space law in effectively regulating emissions of greenhouse gases (GHG) and black carbon. Moreover, the advantages and disadvantages of binding laws (hard laws), which encompass treaties, conventions and directives, and non-binding laws (soft laws), which include declarations, guidelines, codes of conduct and best practices, as well as the appropriateness of harmonisation or unification in selecting the most effective regulatory path, will be discussed in the context of emissions from the aerospace industry. The objectives of this research are to demonstrate the seriousness of rising emissions of greenhouse gases and black carbon from the aerospace industry and their impact on climate change, and highlight the need to create a more effective legal instrument aimed at reducing these emissions. The failure of international binding air and space law to regulate emissions is caused by international disagreements on the form of legal instrument deemed applicable to emissions, widely varying regimes for air and space law, and the politicisation and economisation of law. Legal instruments are divided into two groups: hard law and soft law. For legal instruments to be effective, their harmonisation or unification is required. Two legal research methodologies will be applied. The first of these, doctrinal methodology (van Gestel & Micklitz, 2011; Hutchinson & Duncan, 2012), helps to describe the most efficient and realistic legal framework for regulating emissions from the aerospace industry. The second, interdisciplinary methodology (Heberlein, 1988), is needed to understand the impact of politics and economics on the international lawmaking process.

In Section 2, the author aims to demonstrate the seriousness of the problem of rising emissions of black carbon from the aerospace industry, provide reasons for creating a legal instrument to help reduce emissions, and describe the use of